

CLAIMS

We claim:

1. A roll for applying a sizing composition to a fan of one or more fibers, comprising:

5 a shaft having a curved central axis; and,
a sleeve covering at least a portion of said shaft, said sleeve being rotatable relative to said shaft;

wherein each fiber of said fan of one or more fibers contacts said sleeve at an axial location of said sleeve, and wherein each fiber of said fan of one or more fibers lies substantially in a plane perpendicular to said curved central axis of said shaft at said axial location.

2. The roll of claim 1, wherein said shaft is fixed at one end thereof, and wherein said sleeve is adapted to be connected to a drive device to rotate said sleeve relative to said shaft.

3. The roll of claim 1, wherein said sleeve is
20 constructed from an elastomer material.

4. The roll of claim 3, wherein said sleeve is constructed from one material selected from the group comprising neoprene, natural rubber, silicone rubber and synthetic rubber.

5. The roll of claim 1, wherein said curved central axis includes an arcuate portion thereof, said arcuate portion having a radius defining a focal point spaced from said curved central axis, wherein each fiber of said fan of one or more fibers moves over said roll in a direction substantially towards said focal point.

6. The roll of claim 1, wherein said sleeve rotates about said curved central axis of said shaft.

7. The roll of claim 1, wherein said shaft includes an arcuate center portion, a first linear end portion extending from a first end of said arcuate center portion and a second linear end portion extending from a second end of said arcuate center portion.

8. The roll of claim 7, wherein said sleeve covers all of said arcuate center portion of said shaft, and wherein said

sleeve covers at least a portion of each of said first and second end portions of said shaft.

9. The roll of claim 1, further comprising at least one
5 bushing interposed between (of said) sleeve and said shaft,
wherein said bushing is in sliding rotational relationship with
said shaft, and wherein said bushing is affixed to said sleeve
such that said bushing rotates with said sleeve around said
shaft.

10. The roll of claim 9, wherein a first end of said
bushing is affixed to said sleeve, and wherein a second end of
said bushing is affixed to a drive device for effecting rotation
of said sleeve about said shaft.

11. A method of applying a sizing composition to a fan of
one or more fibers, comprising the steps of:

providing an element having a curved central axis;

rotating said element about said curved central axis;

20 applying a coating of sizing composition to said element as
said element rotates about said curved central axis; and,

conveying each fiber of said fan of one or more fibers over

said element, whereby each fiber of said fan of one or more fibers contacts said element at an axial location along said element and moves over said element in a direction which lies substantially in a plane perpendicular to said central axis of said element at said axial location of said element, and whereby said sizing composition is transferred from said element to each fiber of said fan of one or more fibers.

12. A system for applying a sizing composition to a fan of one or more fibers, comprising:

a element having a curved central axis, wherein each fiber of said fan of one or more fibers contacts said element at an axial location along said element and moves over said element in a direction which lies substantially in a plane perpendicular to said central axis of said element at said axial location of said element; and,

a sizing delivery assembly for providing sizing composition to a surface of said element, said sizing composition being transferred to each of said fibers of said fan of one or more fibers when said fibers contact said element.

13. The system of claim 12, wherein said sizing delivery

assembly includes a manifold with a sizing cavity therein and an orifice in fluid communication with said sizing cavity, whereby said sizing composition is delivered to said cavity under pressure, said sizing delivery assembly being positioned
5 adjacent said element such that said sizing is sprayed through said orifice onto said element to form a coating of said sizing composition on a surface of said element.

14. The system of claim 12, wherein said orifice includes a slot.

15. The system of claim 12, wherein said element comprises a sleeve rotatably positioned about a fixed shaft.

16. The system of claim 14, further comprising a mounting frame, said shaft being fixedly secured to said mounting frame.

17. The system of claim 12, wherein said element comprises a rotatable shaft.